The Reciprocal Provenance Layer

A Conceptual Framework for Recursive Provenance Documentation

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Abstract

This publication introduces the concept of the *Reciprocal Provenance Layer*. It describes a recursive provenance structure in which documentation and archiving are returned to the system that originally describes the artwork. Within the *Light and Relic* project, Wikidata documentation is published on Zenodo as a DOI-persistent source and subsequently referenced within the corresponding Wikidata entries. Provenance thus does not merely describe the work but becomes part of its archival identity. This reciprocal relationship generates a public, durable, and machine-readable provenance layer that remains accessible through open infrastructures.

The *Reciprocal Provenance Layer* constitutes a defined layer within the overarching concept of *Living Provenance* and was developed in the context of *Light and Relic* to ensure the long-term anchoring of its provenance.

While Zenodo and Archive.org function as publication environments, Wikidata provides the machine-linkable layer into which archived provenance is returned. The layer is therefore not bound to a single platform but describes the recursive relationship between publication and knowledge systems.

1. Introduction

In provenance research, documentation traditionally serves to describe the origin, transmission, and authenticity of cultural objects. Contemporary digital infrastructures, however, make it possible for documentation itself to become part of provenance. When publications, metadata, and archived descriptions are returned to the very system they explain, a new form of self-referential provenance emerges.

Digital provenance systems primarily document the origin of artifacts but rarely address the origin, authenticity, and long-term preservation of their own provenance documentation. The *Reciprocal Provenance Layer* addresses this gap by returning documentation as a persistent source and thereby integrating it into the provenance itself.

2. Definition

The *Reciprocal Provenance Layer* refers to a process in which the description of a knowledge structure—here, the Wikidata entries of the project—is archived as a DOI-persistent publication and subsequently reintroduced into those entries as a cited source. Through this return, documentation simultaneously becomes both object and source, forming an independent element of provenance.

3. Structural Principle

The principle consists of three steps:

1. Documentation of the knowledge structure
2. Archiving this documentation as a persistent scholarly reference
3. Returning the archived reference to the original structure

This process creates a publicly verifiable reference chain in which documentation and archival systems mutually confirm one another. As a result, a stable, open, and machine-readable provenance layer emerges.

4. Application in *Light and Relic*

In *Light and Relic*, Wikidata entries describe conceptual, material, and procedural components of the project. A corresponding publication is released on Zenodo and assigned a DOI, which is then cited within the Wikidata items. In this way, a publicly accessible provenance space is created in which the act of description itself contributes to provenance and remains durably anchored.

5. Conclusion

The *Reciprocal Provenance Layer* extends classical provenance research by not only documenting the origin of a work but by making the act of documentation itself part of that origin. Through the combination of open, long-term infrastructures such as Zenodo, Wikidata, and Archive.org, a recursive, verifiable, and permanently accessible provenance layer is formed. This layer methodologically complements the concept of *Living Provenance* and is realized for the first time within the *Light and Relic* project.

The *Reciprocal Provenance Layer* represents a performative form of provenance: it does not merely record the origin of a work but actively participates in it. Provenance thus becomes dynamic, self-referential, and integrated into open knowledge environments.

6. Critical Considerations and Potential Limitations

The introduction of the *Reciprocal Provenance Layer* opens an expanded perspective on digital provenance but simultaneously raises methodological and conceptual questions that should be understood as deliberate points of reflection. These concerns relate less to the fundamental functionality of the model than to the conditions under which the described recursive provenance structure can be sustained over time and supported institutionally.

First, the question arises as to whether the return of archived documentation into the original knowledge structure may lead to semantic redundancy. When provenance systems capture both the object and its documentation, overlapping layers of meaning and reference may emerge. The distinction between provenance object and provenance description therefore remains an open theoretical challenge.

Second, the long-term functionality of the layer depends on the continued availability and institutional stability of digital infrastructures. Systems such as Wikidata, DOI registries, or scholarly repositories are subject to technical, organizational, and political change. It therefore remains uncertain to what extent the recursive anchoring can be maintained permanently or how it can be preserved in the event of future platform migrations.

Third, the question of actual repeatability arises. The layer is defined by the possibility of repeatedly archiving documentation and reintegrating it into the provenance system. Whether this recursive action will be continuously performed in practice depends on future decisions, technological developments, and the willingness of institutional systems to support such cyclical references over time.

Fourth, a distinction must be made between data preservation and factual validation. The feedback loop generated by the layer secures the existence and traceability of documentation but does not necessarily guarantee its truthfulness. Internal consistency within the system does not replace external verification. The layer thus ensures that information exists in a specific version but makes no claim regarding its factual accuracy beyond the closed reference system.

Finally, the model points to a fundamental shift in the concept of provenance itself. The traditional distinction between object and documentation is replaced by a reflexive structure in which documentation becomes provenance. This raises epistemological questions concerning the role of archiving as a performative act and the possibility that provenance itself becomes the subject of its own formation.

These limitations are not understood as weaknesses but as constitutive elements of an approach that conceives provenance not as a closed historical record but as an ongoing, open, and reflexive process. In this sense, the *Reciprocal Provenance Layer* represents less a definitive solution than a conceptual invitation to further develop digital provenance research at the intersection of archival theory, infrastructure studies, and contemporary art.

References

Zenodo (CERN)
Wikidata (Wikimedia Foundation)
Archive.org (Internet Archive)

This document represents Version 1.0 of the Reciprocal Provenance Layer concept and may evolve as part of the Living Provenance framework.